

Claims

- [c1] What is claimed is:
1. A semiconductor light-emitting device comprising:
a substrate;
an n-type electrode located on a bottom surface of the substrate;
an active layer located on a top surface of the substrate;
a p-type semiconductor layer covering the active layer;
a reflective layer located on the p-type semiconductor layer; and
a p-type electrode covering the reflective layer.
 - [c2] 2. The semiconductor light-emitting device of claim 1 wherein the substrate is a conductive material.
 - [c3] 3. The semiconductor light-emitting device of claim 1 wherein the p-type semiconductor layer comprises a plurality of p-type III-V compound layers.
 - [c4] 4. The semiconductor light-emitting device of claim 1 wherein the reflective layer is a conductive layer with predetermined reflectivity, the reflective layer reflects light from the active layer to avoid light being absorbed by the p-type electrode.

- [c5] 5. The semiconductor light-emitting device of claim 4 wherein the reflective layer is a single-layer structure.
- [c6] 6. The semiconductor light-emitting device of claim 4 wherein the reflective layer is a multi-layer structure.
- [c7] 7. The semiconductor light-emitting device of claim 4 wherein the reflective layer comprises silver (Ag), aluminum (Al), gold (Au), chromium (Cr), platinum (Pt), or rhodium (Rh).
- [c8] 8. The semiconductor light-emitting device of claim 1 wherein the reflective layer is a conductive layer with predetermined scattering rate, the reflective layer partially reflects light from the active layer to reduce light being absorbed by the p-type electrode.
- [c9] 9. The semiconductor light-emitting device of claim 1 wherein the reflective layer and the p-type semiconductor layer contact at a rough surface, the rough surface having an incline or a curved structure with a specific reflective angle to enhance the reflective layer.
- [c10] 10. The semiconductor light-emitting device of claim 1 further comprising a distributed Bragg reflector (DBR) located between the substrate and the active layer.
- [c11] 11. A semiconductor light-emitting device comprising:

a substrate;
an n-type semiconductor layer covering the substrate;
an active layer and an n-type electrode separately covering portions of the n-type semiconductor layer;
a p-type semiconductor layer covering the active layer;
a first reflective layer located on the p-type semiconductor layer; and
a p-type electrode covering the first reflective layer.

[c12] 12. The semiconductor light-emitting device of claim 11 wherein the substrate is a nonconductive material.

[c13] 13. The semiconductor light-emitting device of claim 11 wherein the n-type semiconductor layer comprises a plurality of n-type III-V compound layers and the p-type semiconductor layer comprises a plurality of p-type III-V compound layers.

[c14] 14. The semiconductor light-emitting device of claim 11 further comprising a second reflective layer located between the n-type semiconductor layer and the n-type electrode.

[c15] 15. The semiconductor light-emitting device of claim 14 wherein the first reflective layer and the second reflective layer are both a conductive layer with predetermined reflectivity, the first reflective layer and the second reflec-

tive layer reflect light from the active layer to avoid light being absorbed by the p-type electrode and the n-type electrode.

- [c16] 16. The semiconductor light-emitting device of claim 15 wherein the second reflective layer and the n-type semiconductor layer contact at a rough surface, the rough surface having an incline or a curved structure with a specific reflective angle to enhance the second reflective layer.
- [c17] 17. The semiconductor light-emitting device of claim 15 wherein the first reflective layer and the second reflective layer are both a single-layer structure.
- [c18] 18. The semiconductor light-emitting device of claim 15 wherein the first reflective layer and the second reflective layer are both a multi-layer structure.
- [c19] 19. The semiconductor light-emitting device of claim 15 wherein the first reflective layer and the second reflective layer comprise silver (Ag), aluminum (Al), gold (Au), chromium (Cr), platinum (Pt), or rhodium (Rh).
- [c20] 20. The semiconductor light-emitting device of claim 14 wherein the first reflective layer and the second reflective layer are both a conductive layer with predetermined scattering rate, the first reflective layer and the second

reflective layer partially reflect light from the active layer to reduce light being absorbed by the p-type electrode and the n-type electrode.

- [c21] 21. The semiconductor light-emitting device of claim 11 wherein the first reflective layer and the p-type semiconductor layer contact at a rough surface, the rough surface having an incline or a curved structure with a specific reflective angle to enhance the first reflective layer.
- [c22] 22. The semiconductor light-emitting device of claim 11 further comprising a distributed Bragg reflector (DBR) located between the substrate and the n-type semiconductor layer.